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09/772,246	01/29/2001	Johara Shireen Shahabuddin	JP920000370US1	9220

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MCGINN & GIBB PLLC  
2568-A RIVA ROAD  
SUITE 304  
ANNAPOLIS, MD 21401

EXAMINER

KENNEDY, LESA M

ART UNIT	PAPER NUMBER
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2151

DATE MAILED: 05/20/2004

8

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/772,246

Applicant(s)

SHAHABUDDIN ET AL.

Examiner

Lesia Kennedy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-57 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date Z.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Remarks***

1. This action is responsive to the application filed on January 29, 2001. Claims 1-57 are pending examination. Claims 1-57 are directed towards the resource allocation in hosting services.
2. Some of the references cited by the examiner are not included in this Office action since they were provided by the applicant as part of the Information Disclosure Statement (paper no. 7).

### ***Specification***

3. The abstract of the disclosure is objected to because it does not adequately describe the claimed subject matter of the dependent claims. Correction is required. See MPEP § 608.01(b).

### ***Claim Objections***

4. Claims 7 and 40 are objected to because of they contain grammatical/typographical errors. Appropriate correction is required.

*Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 6, 8, 14, 19, 21, 27, 32 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Cardellini et al. (“Dynamic Load Balancing on Web Server Systems”, IEEE Internet Computing, Vol. 3, No. 3, May-June 1999, pp. 28-39).

As to claim 1, Cardellini teaches a method of distributing client requests among multiple servers. Cardellini teaches a method including the steps of:

discovering utilization patterns of said clients [page 31, par. 2; Cardellini discloses measuring the average number of data request sent during a certain period of time from a domain (client)]; and

allocating said resources to said clients dependent on said utilization patterns [page 31, par. 2; Cardellini discloses using the measurements (utilization patterns) to assign requests to servers].

As to claim 6, Cardellini teaches the method of claim 1, wherein said hosting-service resources relate to at least one hosting service selected from the group consisting of collaborative hosting services, commerce hosting services, and e-business hosting services [pg. 28, par. 3; Cardellini discloses web hosting (collaborative hosting services)].

As to claim 8, Cardellini teaches the method of claim 1, wherein said utilization patterns are dependent upon access rates of one or more websites [pg. 31, par. 2; Cardellini discloses measuring the average number of requests sent from each client to a website].

Claims 14, 19 and 21 represent apparatus claims that correspond to method claims 1, 6 and 8, respectively. They do not teach or define any new limitations above claims 1, 6 and 8, and therefore are rejected for similar reasons.

Claims 27, 32 and 34 represent computer program product claims that correspond to method claims 1, 6 and 8, respectively. They do not teach or define any new limitations above claims 1, 6 and 8, and therefore are rejected for similar reasons.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

8. Claims 40, 42-45, 46, 48-51, 52 and 54-57 are rejected under 35 U.S.C. 102(a) as being anticipated by Huh et al. ("Heterogeneous Resource Management", Proc. 9<sup>th</sup> Heterogeneous Computing Workshop, 1 May 2000, pp. 287-296).

As to claim 40, Huh teaches a system for managing heterogeneous host resources to support QoS of dynamic distributed real-time systems. Huh teaches a system including:

means for modeling utilization of resources of one or more servers by clients in response to at least one of utilization patterns of said clients and specified rules regarding quality of

service [pg. 289, col. 1, par. 1-3; Huh discloses evaluating the resource availability (utilization) of hosts (servers) in order to meet quality of service requirements]; and

means for determining a minimum number of servers for accommodating said clients to ensure a specified minimum quality of service [pg. 289, col. 1, par. 1-3; Huh discloses increasing the number of servers to support replicated or migrated applications when a QoS violation is detected].

As to claim 42, Huh teaches the system of claim 40, wherein said system facilitates optimal management of resources in said hosting computing services [Sec. 2, par. 1; Huh discloses an optimization step in the resource management process].

As to claim 43, Huh teaches the system of claim 40, wherein said hosting computing services include hosting computing resources, computing applications, computing-related services, and network bandwidth [Introduction, par. 1; Huh discloses managing heterogeneous resources on a hosting service].

As to claim 44, Huh teaches the system of claim 40, including means for generating for a service provider a set of suggestions for optimal resource planning and allocation [pg. 289, par. 6; Huh discloses that the optimized resource information is given to a RM (service provider) for efficient allocations].

As to claim 45, Huh teaches the system of claim 40, wherein said system provides an optimization service for use in a business model hosting optimization applications [pg. 288, col. 2, par. 1; Huh discloses providing optimization; Introduction, par. 1; Huh discloses hosting heterogeneous resources (applications)].

Claims 46 and 48-51 represent method claims that correspond to system claims 40 and 42-45, respectively. They do not teach or define any new limitations above claims 40 and 42-45, and therefore are rejected for similar reasons.

Claims 52 and 54-57 represent computer program product claims that correspond to method claims 40 and 42-45, respectively. They do not teach or define any new limitations above claims 40 and 42-45, and therefore are rejected for similar reasons.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 2, 15 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cardellini et al. in view of Kleinberg et al. ("Allocating Bandwidth for Bursty Connections", Proc. 29<sup>th</sup> ACM Symposium on Theory of Computing, 1997, pp. 664-673).

As to claim 2, Cardellini teaches the invention substantially as claimed (see rejection of claim 1 above).

Cardellini does not expressly teach the limitation of providing bounds specifying minimum and maximum hosting-service resources for each of said clients, said allocating step also being dependent upon said bounds.

However, Kleinberg teaches a method for allocating bandwidth for communication sessions in high-speed networks. Kleinberg teaches the limitation of providing bounds specifying minimum and maximum hosting-service resources for each of said clients, said allocating step also being dependent upon said bounds [pg. 666, par. 2-4; Kleinberg discloses a load balancing method that applies upper (maximum) and lower (minimum) bounds to effective bandwidth (resources)].

Cardellini and Kleinberg are analogous art because they relate to load balancing and resource allocation in networks.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Cardellini in view of Kleinberg so as to apply bounds to effective bandwidth. One would be motivated to do so to enable optimization of the load balancing process.

Claim 15 represents an apparatus claim that corresponds to method claim 2. It does not teach or define any new limitations above claim 2, and therefore is rejected for similar reasons.

Claim 28 represents a computer program product claim that corresponds to method claim 2. It does not teach or define any new limitations above claim 2, and therefore is rejected for similar reasons.



Claims 3-5, 16-18 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cardellini et al. in view of Chekuri et al. ("On Multi-dimensional Packing Problems", Proc. 10th ACM-SIAM Symposium on Discrete Algorithms, 1999, pp. 185-194).

As to claim 3, Cardellini teaches the invention substantially as claimed (see rejection of claim 1 above).

Cardellini does not expressly teach the limitation of modeling dimensions for client use measures and said utilization patterns.

However, Chekuri teaches a method for applying multi-dimensional generalizations to optimization techniques for load balancing and resource allocation. Chekuri teaches the limitation of modeling dimensions for client use measures and said utilization patterns [abstract, par. 1; Chekuri discloses allocating resources by considering multi-dimensional tasks (client use measures and utilization patterns)].

Cardellini and Chekuri are analogous art because they relate to load balancing and resource allocation in networks.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Cardellini in view of Chekuri so as to consider multi-dimensionality in allocating resources. One would be motivated to do so to improve performance in large task systems that are typically encountered in database applications.

As to claim 4, the combination of Cardellini in view of Chekuri teaches the limitation of packing said clients using stochastic vectors [abstract, par. 1; Chekuri discloses using vector bin packing to schedule client tasks].

As to claim 5, the combination of Cardellini in view of Chekuri teaches the limitation wherein said packing step utilizes at least one of the processes selected from the group consisting of a Roof Avoidance process, a Minimized Variance process, a Maximized Minima process, and a Largest Combination process. [abstract, par. 1; Chekuri discloses minimizing the number of bins for the maximum load (maximized minima process)].

Claims 16-18 represent apparatus claims that correspond to method claims 3-5, respectively. They do not teach or define any new limitations above claims 3-5, and therefore are rejected for similar reasons.

Claims 29-31 computer program product claims that correspond to method claims 3-5, respectively. They do not teach or define any new limitations above claims 3-5, and therefore are rejected for similar reasons.

Claims 7, 20 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cardellini et al. in view of Huh et al. ("Heterogeneous Resource Management", Proc. 9<sup>th</sup> Heterogeneous Computing Workshop, 1 May 2000, pp. 287-296).

As to claim 7, Cardellini teaches the invention substantially as claimed (see rejection of claim 1 above).

Cardellini does not expressly teach the limitation wherein said allocating step affects a Quality of Service (QoS) guarantee.

However, Huh teaches a method for managing heterogeneous host resources to support QoS of dynamic distributed real-time systems. Huh teaches the limitation wherein said

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allocating step affects a Quality of Service (QoS) guarantee [Introduction, par. 2; Huh discloses making allocation decisions to achieve QoS objectives].

Cardellini and Huh are analogous art because they relate to load balancing and resource allocation in networks.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Cardellini in view of Huh so as to include Quality of Service objectives in the resource allocation process. One would be motivated to do so to ensure clients receive the appropriate QoS for a given connection.

Claim 20 represents an apparatus claim that corresponds to method claim 7. It does not teach or define any new limitations above claim 7, and therefore is rejected for similar reasons.

Claim 33 represents a computer program product claim that corresponds to method claim 7. It does not teach or define any new limitations above claim 7, and therefore is rejected for similar reasons.

Claims 9-13, 22-26 and 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cardellini et al. in view of Sequent ("Application Region Manager, Creating an Agile Computing Infrastructure Through Application Region Management", Sequent Computer Systems, Inc., Beaverton, Oregon, 1998, pp.1-8).

As to claim 9, Cardellini teaches the invention substantially as claimed (see rejection of claim 8 above).

Cardellini does not expressly teach the limitation wherein two or more clients are selected from a plurality of clients on the basis of complementarity, wherein said hosting-service resources are allocated to said selected two or more clients as a combination.

However, Sequent teaches a method of enabling flexibility and control in an enterprise-computing infrastructure. Sequent teaches the limitation wherein two or more clients are selected from a plurality of clients on the basis of complementarity, wherein said hosting-service resources are allocated to said selected two or more clients as a combination [pg. 4, Application Example section; Sequent discloses allocating resources to a group (combination) of training customers (selected clients)].

Cardellini and Sequent are analogous art because they relate to load balancing and resource allocation in networks.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Cardellini in view of Sequent so as to allocate resources based on the similarity of the clients' needs. One would be motivated to do so to ensure that similar clients have access to the resources at the same time.

As to claim 10, the combination of Cardellini in view of Sequent teaches the method of claim 9, wherein said allocating step includes the step of selecting said two or more clients to be allocated to a server, said two or more selected clients each having a peak load that is substantially disjoint in time in relation to a peak load of the remaining other selected clients [pg. 4, col. 1, par. 1; Sequent discloses optimizing resource allocation to clients by considering differences in time zones and business cycles].

As to claim 11, the combination of Cardellini in view of Sequent teaches the method of claim 9, wherein said allocated hosting-service resources include resources allocated exclusively to each of said selected two or more clients [pg. 8, col. 2, par. 2; Sequent discloses assigning each application group (client) to a separate run queue (resource)] and shared resources allocated to said combination for use by said selected two or more clients [pg. 8, col. 2, par.3; Sequent discloses scheduling priorities for application groups (clients) accessing a group of run queues (shared resources)].

As to claim 12, the combination of Cardellini in view of Sequent teaches the method of claim 1, further including the step of monitoring said clients to discover said utilization patterns [pg. 4, col. 2, par. 1; Sequent discloses tracking system usage].

As to claim 13, the combination of Cardellini in view of Sequent teaches the method of claim 10, wherein N clients are selected and allocated to a server, N being an integer greater than or equal to two, said server being partitioned into N virtual servers [pg. 7, col. 1, par. 1; Sequent discloses partitioning a processor (server) into application regions (virtual servers)], each client being exclusively allocated a corresponding one of said N virtual servers [pg. 8, col. 2, par. 1; Sequent discloses assigning a process (client) to a specific run queue (virtual server)], excess capacity of said server beyond the capacity required to provide said N virtual servers is shared by said N clients [pg. 8, col.2, par. 1; Sequent discloses assigning priorities to processes (clients) sharing multiple run queues (virtual servers)].

Claims 22-26 represent apparatus claims that correspond to method claims 9-13, respectively. They do not teach or define any new limitations above claims 9-13, and therefore are rejected for similar reasons.

Claims 35-39 represent computer program product claims that correspond to method claims 9-13, respectively. They do not teach or define any new limitations above claims 9-13, and therefore are rejected for similar reasons.

Claims 41, 47 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huh et al. in view of Chekuri et al. v

As to claim 41, Huh teaches the invention substantially as claimed (see rejection of claim 40 above).

Huh does not expressly teach the limitation of the determining means utilizing stochastic vector packing.

However, Chekuri teaches a method for applying multi-dimensional generalizations to optimization techniques for load balancing and resource allocation. Chekuri teaches the limitation of the determining means utilizing stochastic vector packing vectors [abstract, par. 1; Chekuri discloses using vector bin packing to schedule client tasks].

Huh and Chekuri are analogous art because they relate to load balancing and resource allocation in networks.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Huh in view of Chekuri so as to treat the process of allocating resources to client tasks as a process of packing multi-dimensional items into multi-dimensional bins. One would be motivated to do so to improve performance in large task systems that are typically encountered in database applications.

Claim 47 represents a method claim that corresponds to system claim 41. It does not teach or define any new limitations above claim 41, and therefore is rejected for similar reasons.

Claim 53 represents a computer program product claim that corresponds to system 41. It does not teach or define any new limitations above claim 41, and therefore is rejected for similar reasons.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lesa Kennedy whose telephone number is (703) 305-8865. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenton Burgess can be reached on (703) 305-4792. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

*Andrew Caldwell*  
Andrew Caldwell